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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/305,019	05/04/1999	WIESLAW J. ROTH	10151-1	1528

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EXAMINER

NGUYEN, TAM M

ART UNIT PAPER NUMBER

1764

DATE MAILED: 02/25/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/305,019

Applicant(s)

ROTH ET AL.

Examiner

Tam M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 14, 2003 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

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claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4-9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. (5,557,024) in view of Kuchenmeister et al. (EP 0733608)

Cheng discloses alkylation and transalkylation processes in which a feed containing an aromatic compound (e.g., benzene) and olefins (e.g., ethylene) is contacted with MCM-56 or beta zeolite catalyst in an alkylation zone to produce monoalkylbenzene products such as ethylbenzene. By-products (e.g., polyalkylbenzene), which are produced in the alkylation step, can be recycled to the alkylation reactor to undergo transalkylation or they can be reacted with additional aromatic feed in a separate reactor in the presence of TEA mordenite catalyst to produce monoalkylbenzene products. Cheng discloses reaction conditions for the alkylation step wherein the reaction takes place under liquid phase conditions at temperatures between 150 and 260° C and pressures up to 3000 psig in a space velocity of from 0.01 to 20 WHSV, based on ethylene feed. Cheng also indicates that the ratios of benzene to ethylene in the alkylation reactor may be from 1:1 to 30:1 molar. Cheng further discloses that the transalkylation zone is operated in a stoichiometric excess of aromatic compounds. Therefore, the ratio of benzene to polyalkylbenzene is greater than one. (See col. 3, lines 25-27; col. 5, lines 19-25; col. 6, lines 1-3; col. 12, line 10 through col. 14, line 40)

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Kuchenmeister discloses a transalkylation process of polyalkylbenzenes (e.g., polyethylbenzene) which are produced during the alkylation of benzene with olefins (e.g., ethylene) by using a crystalline aluminosilicate catalyst having an average size of less than about  $0.50\ \mu\text{m}$ . The alkylation and the transalkylation processes are conducted at a temperature between  $250^{\circ}\text{C}$  and  $500^{\circ}\text{C}$ , a pressure between 200 psi and 500 psi (1390 - 3447 kPa), at a WHSV from about 20 to  $150\ \text{hr}^{-1}$ , and a feeding ratio of benzene to ethylene from about 2:1 to 20:1. The reference discloses that the transalkylation process can be operated in a separate reactor, but it is preferred to recycle the polyalkylbenzenes to the transalkylation reactor. (See page 2 through page 3)

Regarding claim 4, Cheng does not disclose that the mordenite catalyst has an average crystal size of less than 0.5 micron. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cheng to utilize a TEA-mordenite catalyst having an average crystal size of less than 0.5 micron given Kuchenmeister's teaching that improved transalkylation control in the production of ethylbenzene is attributable "to the use of an aluminosilicate catalyst having a crystal size less than 0.5 microns". (See Kuchenmerister, page 3, lines 29-30).

Claim 10 stands rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 4 above, and further in view of Innes et al. (4,891,458).

All of the references above do not disclose the claimed transalkylation operating pressure and the weight ratio of benzene to polyalkylated benzene.

Innes discloses a transalkylation process of polyalkylbenzene and an aromatic compound (e.g., benzene) in which the transalkylation process is operated at a pressure of 50 psig to 100

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psig (344 -6894 kPa) to maintain the process in the liquid phase. The reference also discloses that the molar ratio of aromatic hydrocarbon to polyalkylated aromatic hydrocarbon ranges from about 1:1 to about 50:1. This ratio appears to be within the range of the claimed weight ratio. (See col. 5, lines 43-54)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Kuchenmeister/Cheng process by operating the transalkylation process at the pressure and the molar ratio of aromatic hydrocarbon to polyalkylated aromatic hydrocarbon as taught by Innes because the Innes pressure will maintain the process in the liquid phase and the Innes ratio is effective for a transalkylation process of an aromatic hydrocarbon with a polyalkylated aromatic hydrocarbon.

### ***Response to Argument***

The argument that there is no motivation to combine the Cheng reference and the Kuchenmeister reference because Cheng does not disclose the claimed catalyst size and the Kuchenmeister transalkylation catalyst is primarily monoclinic aluminosilicate, but can contain up to about 40% orthorhombic crystalline structure is noted. However, the argument is not persuasive because the examiner maintains that one of skill in the art would modified the TEA-mordenite catalyst of Cheng by using a TEA-mordenite catalyst having a crystal size of less than 0.5 microns given Kuchenmeister's teaching that improved transalkylation control in the production of ethylbenzene is attributable " to the use of an aluminosilicate catalyst having a crystal size less than 0.5 microns.

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The argument that the Kuchenmeister catalyst has the silica to alumina ratio of 50 to 500 while the catalyst in the claimed process has a Si/Al ratio of 34 is noted. However, the argument is not persuasive because the Si/Al ratio limitation is not in the claims.

The argument that if the teachings of Kuchenmeister were incorporated into Cheng, Kuchenmeister would teach a transalkylation process in the vapor phase is noted. However, the argument is not persuasive because the examiner modified the process of Cheng by changing only the catalyst size of Cheng and one of skill in the art would operate the process of Cheng under either liquid phase or vapor phase when using a TEA-mordenite catalyst with a size of less than 0.5 micron. It is reminded that the examiner does not use the catalyst of Kuchenmeister in the process of Cheng and does not modify the Cheng catalyst by changing its composition.

The declaration filed February 14, 2003 has been fully considered but it is not persuasive because the three mordenite-catalysts in table 1 in the declaration are different in silica/alumina ratio, alpha value, and surface area. Therefore, it is unclear if the aging rate is dependent on silica/alumina ratio, alpha value, surface area, or combination thereof. For this reason, the existence of unexpected results cannot be determined.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the

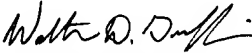
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organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam M. Nguyen  
Examiner  
Art Unit 1764

Tam Nguyen/ TN  
February 22, 2003

  
**Walter D. Griffin**  
**Primary Examiner**